

# OPTIMUM ALLOCATION OF FUND ACCORDING TO RISK PROPENSITY OF THE INVESTORS: A STUDY BASED ON NIFTY DATA

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## ABSTRACT

Risk management plays a vital role in portfolio analysis. It requires adequate knowledge in finance and application of sophisticated techniques. In the allocation of fund analysis, Markowitz mean-variance model is the most popular one. Later, Sharpe's single index model and arbitrage pricing theory have been developed. But all these techniques have not considered the risk perception and risk propensity of the investors. Risk perception of the investor depends on so many factors and it ultimately affect risk propensity of the investors (value system of the investors). In this study an attempt has been taken to analyse the approaches of allocation of fund based on the risk propensity of the investors. The study is conducted on taking NIFTY 50 securities. Finally the results of different approaches are compared with the results of the Markowitz mean –variance portfolio optimisation.

**Keywords:** *Portfolio Optimisation, Optimistic, Pessimistic, Mean-Variance, Euclidean distance*

## INTRODUCTION

Risk management is one of the vital areas in finance. It also plays a vital role in portfolio management. A portfolio is a combination of different assets .It includes physical assets such as land, building, as well as financial assets such as shares, bonds.etc. Portfolio selection problem deals with optimum allocation of investor's fund in different assets or securities. It requires adequate knowledge in finance and application of sophisticated techniques. In allocation of fund analysis, the mean –variance approach of Markowitz (1952, 1959) is most popular and pioneer one. It is based on two parameters of security return: expected return and the variance. The main objective of investors is to maximise return or minimise risk from that investment. The main problem of forming portfolio is the determination of weights for allocation of fund to different assets or stocks. Every investor invests money for earning return from that investment. The external environment of investment is same for all investor but the earnings from the investment varies from investor to investor. There are some investors who are willing to take risk for getting higher return. They are

known as risk takers. On the other hand, there are some investors who are willing to reduce risk. They are known as risk averters. There are another type of investors, known as common investor who behaves randomly for taking investment decisions. Common investors formed portfolio in haphazard and unplanned way. According to different risk propensity of investors, investors assign different weights to different assets. Investment pattern of one investor varies from another investor due to different risk propensity of the investors. In this context an attempt has been taken to analyse the different approaches of allocation of fund based on the risk propensity of the investors.

## OBJECTIVES OF THE STUDY

The main objectives of the study are the followings

1. To determine optimum allocation of funds according to the risk propensity of the investors.
2. To compare the results of optimum allocation of funds based on the risk perception of the investors with optimum allocation of funds based on Markowitz mean variance model.

## LITERATURE REVIEW

For selection of optimal portfolio, a large number of studies have been conducted. The most popular model of selection of optimum portfolio is Markowitz model (1952). It requires huge number of information for determination of optimum portfolio. After that William Sharpe developed single index model. Here it is assumed that security return is dependent on the market index.

Later, Arbitrage pricing theory (APT) was developed by Ross (1976). APT is a multifactor model. According to APT, expected return of a security is a function of macro- economic factors. Sensitivity of each factor is measured by specific macro-economic beta. Expected price of security can be calculated with the help of estimated expected rate of return. If the price of any security differs from expected price, then equilibrium is achieved through arbitrage. But in all these studies, allocation of fund to different securities is done based on risk and return dimension of securities. For this purpose, different sophisticated techniques such as genetic algorithm (Hachloufi(2012) Sefiane,S & Benbouziane,,M (2012) Sinha, Chandwani, and Sinha, (2013)), anti-colony optimisation (Haqiqi, and Kazemi, (2012)), particle swarm optimisation (Kendall and Su (2005) ), Non-smooth optimisation methods (Beliakov, G & Bagirov, A (2006)), Heuristic algorithms (Mansini & Speranza, (1999) , Mansourfar,(2013)) ,Shrinkage technique ( Okhrin & Schmid, (2008) ) and fuzzy technique have been used. Schaerf (2002) used local search technique for constrained portfolio optimisation. But allocation of fund not only dependent on risk return characteristics of individual securities, but also dependent on the risk perception and risk propensity of the individual investor. Here risk perception of investor is dependent on so many factors. Abdeldayem (2015) identified different factors such as worry & anxiety, probability of loss, diversification, earnings volatility and liquidity that affect the perception of investor regarding risk. He studied the impacts of perception of investors on the portfolio management.

On the other hand risk propensity refers tendencies of the investors to take risk or to avoid risk. Risk perception of the investor affect the risk propensity of the investor or the value system of the investors. So optimum allocation of funds is dependent on the risk return characteristics of individual securities, techniques used, risk perception and risk propensity of individual investors. In their study, Roy, Mitra and Chowdhury(2010) applied heuristic procedure to compute securities weights. They have considered for risk taker and risk aversive investor. In their study an attempt has been made to study the influence of risk taking propensity of investor on the expected return and risk of portfolio and to examine how closely they are related to the optimum portfolio Panja and Roy (2014) also used heuristic procedure for studying risk- based selection of portfolio. In their study, City Block distance method is applied to measure the departure of heuristic solution from the optimum solution. Ramalakhmi et. all (2019) studied the impact of behavioural and cognitive biases on the financial decisions of investors. Chowdhary and Subramanian (2019) have found that personality plays an important role in the investment decisions of the investors.

From the literature, it has been observed that a large number of studies have been conducted for studying the impact of different factors on the financial decisions and determining the weights of securities in a portfolio by using different advanced techniques. In this study, an attempt has been taken to study the impact of the risk propensity of investors on the portfolio return and risk.

## TYPE OF INVESTORS BASED ON RISK PROPENSITY

Investors may be categorised according to risk propensity in to three categories:

**Risk taker:** Risk takers are those type of investors who prefer more returns at any cost of risk. They are willing to take risk for any level of risk. They are more conscious about their returns from the investment. For determination of weights, they emphasize on returns of securities. They assign more weights on high income generating securities. They are known as optimistic investors.

**Risk adverse Investors:** Risk averse investors wants to avoid risk. They prefer lower returns with lower level of risk. They are satisfied with lower level of return. They assign high weight to the security that is associated with lower level of risk. They are known as pessimistic investors.

**Common investors:** Most of the investors prefer a satisfactory level of return with a moderate level of risk. They lie in between risk taker and risk adverse investor. Some time they assign weight equally or sometime they assign weight haphazardly to the securities.

## METHODOLOGY

### Data

The empirical study is based on data set in the S& P CNX Nifty constituents. There are fifty companies in S& P CNX Nifty 50. For our studies, the companies which are included in the index, are considered initially, it is a well diversified stock index accounting for several industries of the economy. For this purpose nifty constituents as on 3rd April, 2020 has

been considered. Monthly share prices of fifty stocks have been collected for the period April, 2015 to march, 2020 from www.moneycontrol.com. Monthly returns of fifty stocks have been computed using the following formula.

For computation purpose, Microsoft Excel, R software have been used and LINGO 8.0 has been used for optimisation purpose.

### Techniques used for the study

For selection of stocks, average monthly returns and standard deviation are computed for fifty stocks. Stocks are ranked according to return per unit of risk. From that, top ten stocks have been selected from fifty stocks. The main objective of the study is to study how risk propensity of an investor affects the allocation of funds to different stocks for constructing a portfolio. In the following way, optimistic, pessimistic and common investors determine their weights to different stocks.

### Optimistic Investor (Risk taker investor):

They want to maximise their return at any level of risk. So they assign maximum weight to the stock which generates maximum return and least weight to the stock that generate lower return. According to their approaches, weight of a security is directly related with expected return of that security. A locational shift is needed to ensure non-negativity in the system. Here locational shift is done taking lower mean return of security as origin. So, optimistic investor determines weight of any security in the following way.

$$W_i^{optimistic} = \frac{(\bar{R}_i - \bar{R}_{min})}{\sum_1^n (\bar{R}_i - \bar{R}_{min})} (1)$$

Where,  $\bar{R}$

$\bar{R}_i$  = Average monthly return of ith security.

$\bar{R}_{min}$  = Minimum average monthly return

### Pessimistic investor (Risk averse investor):

pessimistic investors satisfied with lower return. They are more concerned with the risk of the portfolio. They want to reduce risk. They assign least weight to that security that is associated with maximum variance and assign maximum weight to that security with lower variance. According to their approaches, weight of any security is inversely related with the variance of that security. So pessimistic investor determines weight of any security in the following way.

$$W_i^{pessimistic} = \frac{1}{\sum_i^n \frac{1}{\sigma_i}} (2)$$

Where,

$\sigma_i$  = Standard deviation of return of ith security

**Common investor:** They are neither optimistic nor pessimistic. They are not interested in maximum return. They allocate their fund equally to all security. They determine weight of each security in the following way.

$$W_i^{common} = 1/n (3)$$

Where n= Number of securities considered for formation of portfolio.

After calculating weight of optimistic, pessimistic and common investors, portfolio return and portfolio risk are calculated for

optimistic, pessimistic and common investor in the following way.

$$\text{Portfolio return}(R_p) = \sum_{i=1}^n R_i X_i \quad (4)$$

$$\text{Portfolio variance } (G^2_p) = \tilde{x}^T \Sigma \tilde{x} \quad (5)$$

Where,

$n$  = number of securities considered for formation of portfolio.

$x_i$  = Proportion of fund invested in security I in the portfolio.

$\tilde{x}$  = weight vector T

$R_i$  = Represents the average return on ith security.

$\Sigma$  = Variance-Covariance matrix of returns of the securities

### Optimum solution as per Markowitz mean variance framework:

In the mean-variance framework, investors consider that portfolio which minimizes risk subject to a given return level. The optimum portfolio is determined on the basis of minimum variance of the portfolio. The Markowitz model can be presented in the following way.

#### Objective Function:

Minimise Portfolio variance

$$(G^2_p) = \tilde{x}^T \Sigma \tilde{x}$$

#### Constraints

Budget constraint:

$$\sum_{i=1}^n x_i = 1$$

$$x_i \geq 0$$

Minimum return constraints:

$$\sum_{i=1}^n R_i x_i = R_L$$

Where,

$n$  = number of securities considered for formation of portfolio.

$x_i$  = Proportion of fund invested in security I in the portfolio.

$\tilde{x}$  = weight vector

$R_i$  = Represents the average return on ith security.

$\Sigma$  = Variance-Covariance matrix of returns of the securities.

At last, in order to check the closeness of different solutions according to risk propensity of investor with optimum solution as Markowitz mean –variance model, Euclidean distance is measured. If two points are P ( $X_1, Y_1$ ) and Q ( $X_2, Y_2$ ), then the distance from P to Q is given by

$$PQ = \sqrt{(X_1 - X_2)^2 + (Y_1 - Y_2)^2}$$

## FINDINGS OF THE STUDY

### Selection of securities on the basis of return per unit of risk.

The return and standard deviation of fifty stocks are given in the table 1. Table 1 shows that average monthly return of Bajaj Finance Ltd. (3.75%) is the highest and average monthly return of Tata Motor (-2.245%) is the lowest among fifty stocks. On the other hand, standard deviation of returns of company Tata Motors is highest. So risk of security in case of Tata Motor is the highest and risk of security in case of Hindustan Unilever Ltd. is the lowest. So from the return perspective, Bajaj Finance is preferable since it yields highest average rate of return. Similarly an investor, who wants to reduce risk, prefers the lowest standard deviation security (Hindustan Unilever Ltd). So both risk and return are important in selection of a security.

Table 1: Average monthly return and standard deviation of NIFTY stocks.

Sl. No.	Name of company	Aver. Monthly return (%)	Standard deviation (%)	Ratio	Rank
1.	Sun Pharmaceutical Industries Ltd.	-1.296	8.363	-0.155	47
2.	Cipla Ltd.	-0.454	6.922	-0.066	41
3.	ITC Ltd.	-0.202	5.964	-0.034	38
4.	GAIL(India) Ltd.	-0.092	8.626	-0.011	34
5.	ONGC Ltd.	-1.446	8.59	-0.168	49
6.	BPCL	0.902	10.372	0.087	16
7.	Mahindra & Mahindra Ltd.	-0.741	8.901	-0.083	44
8.	Zee Entertainment Enterprises Ltd.	-0.741	8.901	-0.083	45
9.	Tech Mahindra Ltd.	0.196	8.436	0.023	27
10.	Bharti Infratel Ltd	-0.96	11.1	-0.086	46
11.	Dr. Reddy's Laboratories Ltd.	0.202	7.683	0.026	25
12.	Power Grid Corporation of India Ltd.	0.35	5.698	0.061	20
13.	Larsen & Toubro Ltd.	-0.154	8.219	-0.019	35
14.	Indian Oil Corporation Ltd.	0.243	9.202	0.026	26
15.	Reliance Industries Ltd.	1.931	8.055	0.24	6
16.	Bharti Airtel Ltd.	0.725	8.291	0.087	17
17.	Bajaj Finserv Ltd.	2.783	11.851	0.235	7
18.	Britannia Industries Ltd	1.756	6.853	0.256	4
19.	Vedanta Ltd	-1.074	13.049	-0.082	43
20.	JSW Steel Ltd.	1.237	9.416	0.131	12
21.	Adani Ports and Special Economic Zone Ltd.	0.121	10.207	0.012	31
22.	Bajaj Finance Ltd	3.75	11.961	0.314	2
23.	NTPC Ltd.	-0.451	6.591	-0.068	42
24.	HCL Technologies Ltd.	0.179	6.153	0.029	24
25.	Hindustan Unilever Ltd..	1.819	4.943	0.368	1

26.	Coal India Ltd.	-1.347	7.083	-0.19	50
27.	Bajaj Auto Ltd.	0.352	7.454	0.047	23
28.	UPL Limited	0.43	9.05	0.048	22
29.	Kotak Mahindra Bank	1.334	6.35	0.21	8
30.	HDFC Bank Ltd.	1.139	6.062	0.188	10
31.	Infosys Ltd.	0.657	6.092	0.108	15
32.	Tata Consultancy Services Ltd.	0.885	6.763	0.131	13
33.	Eicher Motors Ltd.	0.153	9.091	0.017	30
34.	Hero Motocorp Ltd.	-0.356	7.48	-0.048	40
35.	Hindalco Industries Ltd	0.215	11.76	0.018	29
36.	UltraTech Cement Ltd.	0.643	7.934	0.081	18
37.	Tata Motors Ltd.	-2.245	14.447	-0.155	48
38.	Nestle India Ltd.	1.732	6.06	0.286	3
39.	Tata Steel Ltd.	0.101	10.049	0.01	32
40.	Grasim Industries Ltd.	-0.335	8.233	-0.041	39
41.	Wipro Ltd.	0.12	5.852	0.021	28
42.	Asian Paints Ltd.	1.501	5.917	0.254	5
43.	HDFC Ltd.	0.808	6.871	0.118	14
44.	Maruti Suzuki India Ltd.	0.699	9.347	0.075	19
45.	State Bank of India	0.003	10.171	0	33
46.	Shree Cement Ltd.	1.289	8.592	0.15	11
47.	Titan Company Ltd.	1.976	9.534	0.207	9
48.	ICICI Bank Ltd.	0.546	9.014	0.061	21
49.	IndusInd Bank Ltd.	-0.339	12.086	-0.028	37
50.	Axis Bank	-0.191	9.185	-0.021	36

Source: Compiled by the author

To consider risk and return dimension of a security simultaneously, return per unit of standard deviation of a security is taken into consideration. For that purpose, return per unit of risk is calculated separately for fifty securities and arranged in ascending order and on the basis of that, ten

securities are considered for portfolio formation. The list of selected ten securities is given in Table 2. These ten securities are considered for portfolio formation.

**Table 2: List of selected ten stocks or securities for portfolio construction.**

Sl. No	Name of Company	Aver. Monthly return(%)	Standard deviation(%)	Mean/standard deviation	Rank
1.	Hindustan Unilever Ltd..	1.819119	4.942696	0.368042	1
2.	Bajaj Finance Ltd	3.74984	11.96069	0.313514	2
3.	Nestle India Ltd.	1.732452	6.059773	0.285894	3
4.	Britannia Industries Ltd	1.755813	6.852693	0.256222	4
5.	Asian Paints Ltd.	1.501119	5.916528	0.253716	5
6.	Reliance Industries Ltd.	1.930551	8.055307	0.239662	6
7.	Bajaj Finserv Ltd.	2.78333	11.85073	0.234866	7
8.	Kotak Mahindra Bank	1.333699	6.349743	0.21004	8
9.	Titan Company Ltd	1.976331	9.534287	0.207287	9
10.	HDFC Bank Ltd.	1.138948	6.061848	0.187888	10

Source: Compiled by the author

### **Portfolio construction according to risk propensity of investors**

In portfolio formation, the main problem is the determination of weight of individual security. The risk taking propensity of an investor influences the determination of weight of individual securities. An optimistic investor wants to take more risk for getting high return. So return is the important factor for optimistic investor. An optimistic investor will assign more weight to that security that yields highest return. An optimistic investor determines weight of individual securities using the equation no. (1). Table 3 shows the weights of ten securities for optimistic investor. Portfolio return and risk have been calculated with help of equation

**Table 3: Optimistic investor's weights to different stocks.**

Sl. No.	Name of Company	Aver. Monthly return(%)	Weight
1.	Hindustan Unilever Ltd..	1.819119	0.0816
2.	Bajaj Finance Ltd	3.74984	0.3134
3.	Nestle India Ltd.	1.732452	0.0712
4.	Britannia Industries Ltd	1.755813	0.074

5.	Asian Paints Ltd.	1.501119	0.0435
6.	Reliance Industries Ltd.	1.930551	0.095
7.	Bajaj Finserv Ltd.	2.78333	0.1974
8.	Kotak Mahindra Bank	1.333699	0.0234
9.	Titan Company Ltd	1.976331	0.1005
10.	HDFC Bank Ltd.	1.138948	0
Total weight			1.00
Port folio Return			2.6
Portfolio Risk			54.68

Source: Compiled by the author

An optimistic investor assigned more weight to Bajaj Finance Ltd. According to optimistic investor, 31.34% of the total fund is to be allocated for security of Bajaj Finance Ltd since the mean monthly return of this security is the highest (3.74%). As mean return of HDFC bank is the lowest among ten securities, for that reason, optimistic investor would not allocate fund to HDFC bank. After getting weights of individual securities, portfolio return and risk have been calculated using equations (4) and (5). An optimistic investor will earn monthly portfolio return 2.6% and his portfolio variance will be 54.68%..

On the other hand, pessimistic investor will prefer lowest variance securities. Pessimistic investor is more concerned about the risk of securities. They are not willing to take risk. They prefer lower return for lower level of risk. They will assign more weight to the lowest variance security. Using equation no-(2), weights of different securities are determined. Table 4 shows the pessimistic investor's weight to individual securities. Pessimistic investors will assign more weight (14.43%) to Hindustan Unilever Ltd since it has lowest standard deviation of returns (4.94%) and least weight (5.96%) to Bajaj Finance Ltd. Pessimistic investors will earn monthly portfolio return 1.82% for portfolio variance 23.25 %.

**Table 4: Pessimistic investor's weight to different stock.**

Sl. no	Name of the company	Standard deviation(%)	Weight
1.	Hindustan Unilever Ltd..	4.942696	0.1443
2.	Bajaj Finance Ltd	11.96069	0.0596
3.	Nestle India Ltd.	6.059773	0.1177
4.	Britannia Industries Ltd	6.852693	0.1041

5.	Asian Paints Ltd.	5.916528	0.1206
6.	Reliance Industries Ltd.	8.055307	0.0886
7.	Bajaj Finserv Ltd.	11.85073	0.0602
8.	Kotak Mahindra Bank	6.349743	0.1123
9.	Titan Company Ltd	9.534287	0.0748
10.	HDFC Bank Ltd.	6.061848	0.1178
Total weight			1
Port folio Return			1.82
Portfolio Risk			23.25

Source: Compiled by the author

A common investor is not concerned with high return or risk. He expects a moderate return with a moderate level of risk. He invests his fund haphazardly or in unplanned way. Generally a common investor assigns equal weight to each of the security. Here ten securities are considered for construction of portfolio. So weight of each security will be 0.10 and his expected portfolio return and variance will be 1.92% and 29.19 % respectively (Using eqn. (4) and eqn. (5)). Table 5 shows the assignment of weight by a common investor.

**Table 5: Common Investor's weight to different stock.**

Sl. no	Name of the company	Weight
1.	Hindustan Unilever Ltd..	0.10
2.	Bajaj Finance Ltd	0.10
3.	Nestle India Ltd.	0.10
4.	Britannia Industries Ltd	0.10
5.	Asian Paints Ltd.	0.10
6.	Reliance Industries Ltd.	0.10
7.	Bajaj Finserv Ltd.	0.10
8.	Kotak Mahindra Bank	0.10
9.	Titan Company Ltd	0.10
10.	HDFC Bank Ltd.	0.10
Total weight		1

Port folio Return	1.97
Portfolio Risk	29.19

Source: Compiled by the author

### Optimum allocation to different assets as per mean-variance model of Markowitz

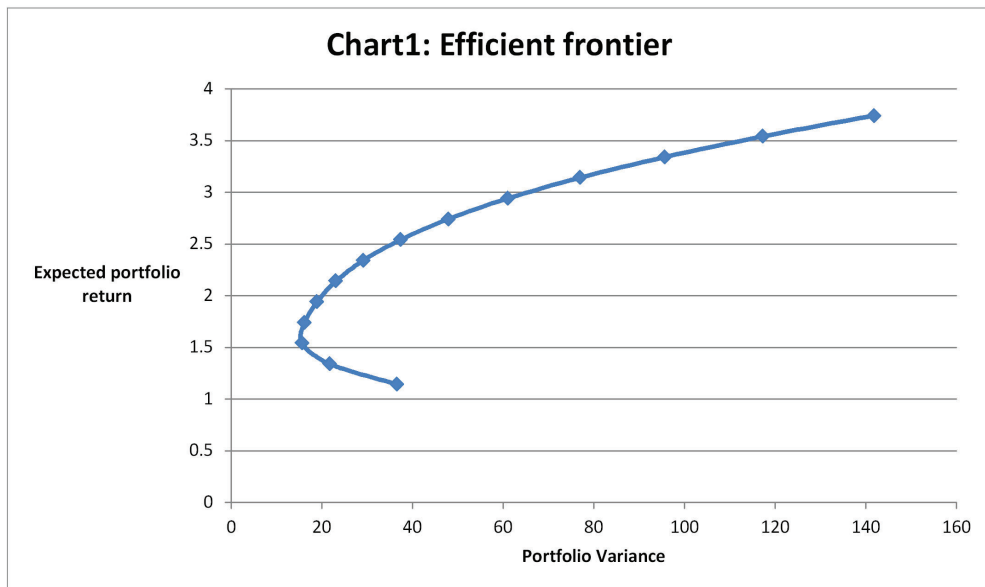
After considering optimistic, pessimistic and common investor's portfolio construction, Markowitz optimum portfolio construction has been considered here. Construction of optimum portfolio may be formed in two alternative ways:- either minimisation of portfolio variance subject to a given level of portfolio return or maximisation of return subject to a given level of risk. Here former alternative has been considered. For each return level, there is a optimum solution. Generally if return level increases, then portfolio variance increases. Here optimum solution is determined on the basis of minimum portfolio variance. The minimum monthly return level is 1.14% and the maximum monthly return level is 3.75 %. Here optimum solution is determined using LINGO 8.0 software for each return level starting from return level 1.14. In each step, return level is increased by 0.20.

**Table 6: Portfolio variance under different return levels as per Markowitz mean-variance framework.**

SI No.	Expected monthly portfolio return (%)	Portfolio Variance (%)
1.	1.14	36.63
2.	1.34	21.72
3.	1.54	15.66
4.	1.74	16.22
5.	1.94	18.95
6.	2.14	23.11
7.	2.34	29.11
8.	2.54	37.35
9.	2.74	47.92
10.	2.94	61.01
11.	3.14	76.94
12.	3.34	95.71
13.	3.54	117.32
14.	3.74	141.78

Source: Compiled by the author

Efficient frontier is shown In Chart 1, It is a locus of combination of portfolio risk and expected portfolio return



At return level 1.54%, portfolio variance is minimum, optimum portfolio is determined at return level 1.54% and on that return level, portfolio variance is minimum. Optimum allocation as per Markowitz mean-variance model to different stock at return level 1.54% is presented in table 7.

**Table 7: Optimum allocation as per Markowitz mean-variance model.**

Sl. No.	Name of the company	Weights
1.	Hindustan Unilever Ltd..	0.3867
2.	Bajaj Finance Ltd	0
3.	Nestle India Ltd.	.1424
4.	Britannia Industries Ltd	0
5.	Asian Paints Ltd.	.1478
6.	Reliance Industries Ltd.	0
7.	Bajaj Finserv Ltd.	0
8.	Kotak Mahindra Bank	0
9.	Titan Company Ltd	0
10.	HDFC Bank Ltd.	.3231

Total weight	1	76.94
Port folio Return	1.54%	95.71
Portfolio Risk	15.66	117.32

Source: Compiled by the author

Table 3 shows that optimistic investors will generate monthly portfolio return of 2.6% for portfolio variance level 54.68%. On the other hand, pessimistic investor's monthly portfolio return and variance will be 1.82% and 23.25 respectively (as depicted in table 4). Common investor lies in between them. Common investor will earn monthly portfolio return 1.97% and portfolio variance will be 29.19% for common investor. But if the investor follows mean-variance model of portfolio optimisation, then portfolio variance is minimum at the monthly return level of 1.54%. At that return level, portfolio variance is minimum (15.66%). Portfolio return and variance under different situations are given in table 8.

**Table 8: Expected monthly portfolio return and portfolio variance of optimistic, pessimistic, common investor and Markowitz mean –variance Model.**

	<b>Expected monthly Portfolio Return (%)</b>	<b>Expected portfolio Variance (%)</b>
Optimistic Investor	2.6	54.68
Pressimistic Investor	1.82	23.25
Common Investor	1.97	29.19
Optimum Portfolio	1.54	15.66

Source: Compiled by the author

To check the closeness between optimum allocations as per risk propensity of investors and optimum allocation as per mean –variance model using Euclidean distance method. It is shown in table 9

**Table 9: Euclidean distance.**

	<b>Description</b>	<b>Euclidean Distance</b>
1.	Distance between optimist's allocation and optimum portfolio	69.19
2.	Distance between pessimist's allocation and optimum portfolio	13.46
3.	Distance between common investor's allocation and optimum portfolio	23.99

Source: Compiled by the author

From the above table, it is clear that allocation based on Markowitz mean-variance model provides better results and allocation based on pessimistic investor's views is more closure to the optimum portfolio.

## IMPLICATIONS OF THE STUDY

From the analysis, it is clear that an optimistic investor assigns maximum weight to the security whose mean return is higher than other security and assigns least weight to the security whose mean return is lowest. If the investor follows this approach, his return as well as risk will increase. On the other hand, a pessimistic investor wants to avoid risk, he will assign maximum weight to the security whose variance is lower than other security. As a result, it will reduce the return and risk level of the investor. A common investor lies in between optimistic and pessimistic investor. He is interested in a moderate level (average level) of return and risk. portfolio variance as per mean-variance model is lower than portfolio variances that are computed based on risk propensity of optimistic, pessimistic and common investors. So optimum allocations as

per Markowitz mean –variance model provides lower portfolio variance at lower level of return. Allocation based on pessimistic investor's view is more closure to the solutions that is generated by applying Markowitz mean-variance model. So this study will help the present and potential investors in deciding optimum allocation of their funds to different assets or forming portfolio based on their risk taking capacity.

## LIMITATIONS AND FUTURE SCOPE OF THE STUDY

In this study, an attempt has been taken to show how investors allocate their fund according to their risk propensity. But risk propensity and risk perception depend on so many factors. In this study these factors are not taken into consideration. So there is a scope of analysing the impact of different factors on the risk perception and risk propensity of the investors.

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